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JACKSON WALKER LLP
901 MAIN STREET
SUITE 6000
DALLAS, TX 75202-3797

EXAMINER	
ARIANI, KADE	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/581,678	HU ET AL.	
	Examiner	Art Unit	
	KADE ARIANI	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 March 2009*.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 11-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9, and 11-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The amendment filed on March 19, 2009, has been received and entered.

Claim 10 has been cancelled,

Claims 1-9, 11-47 are pending in this application and were examined on their merits.

Applicant's arguments with respect to claims 1-9, and 11-47 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objection

The objection to claim 29 is withdrawn, due to Applicant's amendments to the claims filed on 03/19/2009.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 15-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim15 is confusing and therefore is indefinite in equating "mono-disperse nanoparticles" with "a mono-dispersed polymer".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The rejection of claims 15, 20-22, 24-26, and 28 under 35 U.S.C. 102(b) as being anticipated by Bouillot et al. (Colloid Polym Sci, 2000, Vol. 278, p.74-79), is withdrawn due to Applicant's amendments to the claims filed on 03/19/2009.

Claims 15, 20-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Jones et al. (Macromolecules, 2000, Vol. 33, p.8301-8306).

Claims 15 and 20-27 are drawn to a method of preparing an interpenetrating polymer network (IPN) of monodispersed nanoparticles, comprising providing a first mono-dispersed polymer nanoparticles prepared by mixing first monomer, a surfactant, a first cross linking agent, and first initiator at a first temperature, (wherein the first polymer has a low critical solution temperature of between 28ºC and 45ºC, the first polymerization temperature is above the LCST of the first polymer): adding to the first mono-dispersed polymer nanoparticles a second monomer, a second cross linking agent, a second initiator and an activator, forming a nanoparticle solution wherein the

nanoparticle solution is an aqueous solution, mixing the nanoparticles solution for a period of time at a second temperature to form the IPN on mono-dispersed nanoparticles, isolating the IPN nanoparticles, (wherein the first monomer, the first cross linking agent, the second monomer, and the second cross linking agent are substantially free from dissolved oxygen gas and the first wherein the first polymer forms a first polymer network which interpenetrates a second polymer network formed by the second polymer), wherein the first polymer comprises poly (-N-isopropylacrylamide), the second polymer comprises poly (acrylic acid), the first cross linking agent comprises N, N'-methylenebisacrylamide, potassium persulfate, ammonium persulfate, the surfactant comprises SDS, and TEMED (activator), the IPN of nanoparticles hydrodynamic radius is in the range of 75 nm to about 200 nm, period of time is less than 130 minutes, the time is about 120 minutes, and the first temperature is 70°C.

Jones et al. disclose a method of preparing an interpenetrating polymer network of mono-dispersed nanoparticles, comprising providing a first polymer nanoparticles prepared by mixing first monomer, a surfactant, a first cross linking agent, and first initiator at a first temperature (p.8301 2nd column 3rd and 4th paragraphs and p.8302 1st column 1st paragraph, p.8302 1st column end paragraph lines 1-3 and 16), adding to the first polymer nanoparticles a second monomer, a second cross linking agent, a second initiator and an activator, forming a nanoparticle solution wherein the nanoparticle solution is an aqueous solution, mixing the nanoparticles solution for a period of time at a second temperature to form the IPN nanoparticles, isolating the IPN nanoparticles

(p.8302 1st column 1st , 2nd and 3rd paragraphs), wherein the first monomer, the first cross linking agent, the second monomer, and the second cross linking agent are substantially free from dissolved oxygen gas (degassing under vacuum and purging with nitrogen) (p.8302 1st column 1st paragraph line 7-8), the polymerization temperature 70 ºC for 6 hours (p.83 01 1st column end paragraph last line). Jones et al. further disclose the first polymer comprises poly (-N-isopropylacrylamide), the second polymer comprises poly (acrylic acid) or AAc (p.8302 1st column 2nd paragraph line 2), the period of time is 30 minute plus 45 minutes (less than 120 minutes) (p.8302 1st column 1st paragraph line 13-15), and the average hydrodynamic radius of the nanoparticles is in the range of 75 nm to about 200 nm (p.8302 2nd column Figure 2. radius vs. Temp graph, b. Y-axis, radius of particles 80-200 nm).

Jones et al. therefore clearly anticipate the claimed method.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The rejection of claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bouillot et al. (Colloid Polym Sci, 2000, Vol. 278, p.74-79) in view of

Qiu et al. (Advanced Drug Delivery, 2001, Vol. 53, p.321-339) and further in view of over Cai et al. (Journal of Applied Polymer Science, 2002, Vol. 83, p.169-178) and further in view of Jeong et al. (Advanced Drug Delivery Reviews, 2002, Vol. 54, p.37-51), is withdrawn.

The rejection of claims 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bouillot et al. (Colloid Polym Sci, 2000, Vol. 278, p.74-79) in view of Kurisawa et al. (Journal of Controlled Release, 1998, Vol. 54, p.191-200) and further in view of Qiu et al. (Advanced Drug Delivery, 2001, Vol. 53, p.321-339), is withdrawn.

The rejection of claims 15 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bouillot et al. (Colloid Polym Sci, 2000, Vol. 278, p.74-79) in view of Jones et al. (Macromolecules, 2000, Vol. 33, p.8301-8306) and further in view of Soane (US Patent No. 5,135,627), is withdrawn.

The rejection of claims 15 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cai et al. (Journal of Applied Polymer Science, 2002, Vol. 83, p.169-178) in view of Bouillot et al. (Colloid Polym Sci, 2000, Vol. 278, p.74-79), is withdrawn.

The rejection of claims 29-40 and 41-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cai et al. (Journal of Applied Polymer Science, 2002, Vol. 83, p.169-178) in view of Hennink & Nostrum (Advanced Drug Delivery Reviews, 2002, Vol. 54, p.13-36), is withdrawn.

Claims 1-9 and 11-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Jones et al. (Macromolecules, 2000, Vol. 33, p.8301-8306) in view of Kurisawa

et al. (Journal of Controlled Release, 1998, Vol. 54, p.191-200) and further in view of Cai et al. (Journal of Applied Polymer Science, 2002, Vol. 83, p.169-178).

Claims 1-9, and 11-14 are drawn to an aqueous dispersion of hydrogel nanoparticles comprising, interpenetrating polymer network (IPN) nanoparticles, wherein each IPN nanoparticles comprises a first polymer network interpenetrating a second polymer network, and an aqueous medium, wherein the first polymer comprises poly (-N-isopropylacrylamide), the second polymer comprises poly (acrylic acid), wherein the IPN nanoparticles are substantially free of shell and core polymer configuration, and the aqueous dispersion of hydrogel nanoparticles can undergo a reversible gelation in response to a change in stimulus applied thereon, wherein the aqueous dispersion of hydrogel nanoparticles further comprising a biologically active material, a drug, wherein the stimulus is temperature, wherein the temperature change above a gelation temperature (Tg) induces a volume phase transition of the IPN nanoparticles, resulting in an inverse thermo-thickening property of the aqueous dispersion of hydrogel nanoparticles, (and wherein above the Tg the first polymer network consists of cross-linked polymer chains inside each nanoparticle, and the second polymer network consist of a cross-linked system of the nanoparticles), wherein the inverse thermo-thickening property is a transformation from a low viscous fluid to a gel when heated above the Tg, the Tg is about 34ºC, the first polymer comprises poly (-N-isopropylacrylamide), the second polymer comprises poly (acrylic acid), the IPN nanoparticles have a uniformed sized hydrodynamic radius, the average hydrodynamic radius is in the range of 75 nm to about 200 nm, wherein the first polymer and the

second polymer in IPN nanoparticles have weight ratio of about 1:1.88, and total polymer concentration from about 1.25 wt% to about 5.25 wt% in distilled water.

Claims 15-28 are drawn to a method of preparing an interpenetrating polymer network (IPN) of monodispersed nanoparticles, comprising providing a first mono-dispersed polymer nanoparticles prepared by mixing first monomer, a surfactant, a first cross linking agent, and first initiator at a first temperature, (wherein the first polymer has a low critical solution temperature of between 28ºC and 45ºC, the first polymerization temperature is above the LCST of the first polymer): adding to the first mono-dispersed polymer nanoparticles a second monomer, a second cross linking agent, a second initiator and an activator, forming a nanoparticle solution wherein the nanoparticle solution is an aqueous solution, mixing the nanoparticles solution for a period of time at a second temperature to form the IPN on mono-dispersed nanoparticles, isolating the IPN nanoparticles, (wherein the first monomer, the first cross linking agent, the second monomer, and the second cross linking agent are substantially free from dissolved oxygen gas and the first wherein the first polymer forms a first polymer network which interpenetrates a second polymer network formed by the second polymer), mixing the isolated IPN nanoparticles with a biologically active material at a third temperature, the biologically active material is a drug, wherein the third temperature is below a gelation temperature (Tg) of the IPN nanoparticles in a n aqueous mixture, (and wherein above the Tg the first polymer network consists of cross-linked polymer chains inside each nanoparticle, and the second polymer network consist of a cross-linked system of the nanoparticles), wherein the Tg is about 33ºC,

wherein the first polymer comprises poly (-N-isopropylacrylamide), the second polymer comprises poly (acrylic acid), the first cross linking agent comprises N, N'-methylenebisacrylamide, potassium persulfate, ammonium persulfate, the surfactant comprises SDS, and TEMED (activator), the IPN of nanoparticles hydrodynamic radius is in the range of 75 nm to about 200 nm, period of time is less than 130 minutes, is about 120 minutes, the first temperature is 70°C, and the second temperature at about 21°C.

Jones et al. teach a method of preparing an interpenetrating polymer network of nanoparticles, comprising providing a first polymer nanoparticles prepared by mixing first monomer, a surfactant, a first cross linking agent, and first initiator at a first temperature (p.8301 2nd column 3rd and 4th paragraphs and p.8302 1st column 1st paragraph, p.8302 1st column end paragraph lines 1-3 and 16), adding to the first polymer nanoparticles a second monomer, a second cross linking agent, a second initiator and an activator, forming a nanoparticle solution wherein the nanoparticle solution is an aqueous solution, mixing the nanoparticles solution for a period of time at a second temperature to form the IPN nanoparticles, isolating the IPN nanoparticles (p.8302 1st column 1st , 2nd and 3rd paragraphs), wherein the first monomer, the first cross linking agent, the second monomer, and the second cross linking agent are substantially free from dissolved oxygen gas (degassing under vacuum and purging with nitrogen) (p.8302 1st column 1st paragraph line 7-8), wherein the first polymer has a low critical solution temperature of 38 ºC (between 28ºC and 45ºC) (p.83 03 2nd column 2nd paragraph lines 5-6), polymerization temperature 70 ºC (is above the LCST of the

first polymer) (p.83 01 1st column end paragraph last line). Jones et al. further teach the first polymer comprises poly (-N-isopropylacrylamide) (Tg is about 34ºC), the second polymer comprises poly (acrylic acid) or AAc (p.8302 1st column 2nd paragraph line 2), the period of time is 30 minute plus 45 minutes (less than 120 minutes) (p.8302 1st column 1st paragraph line 13-15), and the average hydrodynamic radius of the nanoparticles is in the range of 75 nm to about 200 nm (p.8302 2nd column Figure 2. radius vs. Temp graph, b. Y-axis, radius of particles 80-200 nm).

Jones et al. teach an aqueous dispersion of hydrogel nanoparticles comprising, interpenetrating polymer network (IPN) nanoparticles, wherein each IPN nanoparticles comprises a first polymer network interpenetrating a second polymer network, and an aqueous medium, wherein the first polymer comprises poly (-N-isopropylacrylamide), the second polymer comprises poly (acrylic acid) or AAc (p.8302 1st column 2nd paragraph line 2), and the aqueous dispersion of hydrogel nanoparticles can undergo a reversible gelation in response to a change in stimulus applied thereon, wherein the stimulus is temperature, wherein the temperature change above a gelation temperature (Tg) induces a volume phase transition of the IPN nanoparticles (thermally induced volume phase transition) (Abstract), resulting in an inverse thermo-thickening property of the aqueous dispersion of hydrogel nanoparticles, wherein the inverse thermo-thickening property is a transformation from a low viscous fluid to a gel when heated above the Tg (about 34ºC) (it must be noted that poly (-N-isopropylacrylamide) hydrogels undergoes a reversible volume phase transition at 32ºC, see Cai et al. (p.169 1st column lines 10-14), the IPN nanoparticles have an average hydrodynamic radius is

in the range of 75 nm to about 200 nm (p.8302 2nd column Figure 2. radius vs. Temp graph, b. Y-axis, radius of particles 80-200 nm), and 5% total polymer concentration (about 1.25 wt% to about 5.25 wt) (p. 8302 2nd column end paragraph lines 3), Jones et al. further teach wherein the first polymer and the second polymer in IPN nanoparticles have weight ratio of 9:1 (p.83 02 1st column 1st paragraph line 2).

Jones et al .do not teach mixing the isolated IPN nanoparticles with a biologically active material at a third temperature, third temperature is below a gelation temperature (Tg) of the IPN nanoparticles in an aqueous mixture, the biologically active material is a drug, the second temperature at about 21°C, wherein the IPN nanoparticles are substantially free of shell and core polymer configuration, wherein the first polymer and the second polymer in IPN nanoparticles have weight ratio of about 1:1.88.

Jones et al. teach that at 70°C temperature (polymerization temperature) polymer interpenetration was low and that polymerization inside the nanoparticles can be hindered (p.8302 1st column end paragraph lines 17-19).

Kurisawa et al. teach using interpenetrating polymer network (IPN)-structured hydrogels as a drug microreservoir (as a model of a drug substrate), the a phase morphology in the IPN-structured hydrogels was varied with the preparation temperature, i.e. above or below the sol-gel transition temperature (T_{trans}) of gelatin (Abstract, and p.194 2nd column 1st paragraph). Kurisawa et al. teach the IPN-structured hydrogels were prepared below or above the T_{trans} of gelatin and their enzymatic degradability was examined. Dual-stimuli-responsive degradation was achieved in the IPN-structured hydrogels were prepared below T_{trans} having increased miscibility and

the dual-stimuli-responsive degradation of Gtn-Dex hydrogels was closely related to the miscibility between Gtn and Dex networks (p.192, 1st column last paragraph and 2nd column 1st paragraph). Kurisawa et al. further teach regulated LM release was achieved in the IPN-structured hydrogel prepared below the T_{trans}, and although LM release from IPN-structured hydrogel prepared above the T_{trans} was observed, the difference in the LM release behavior is though to be have been caused by enzymatic degradability of the hydrogels, being closely related to physical chain entanglements between chemically different polymer networks (p.199 2nd column last paragraph, Conclusion).

Jones et al. further teach in core-shell systems one polymer has a chemical or mechanical influence over the swelling of the other polymeric component and display complex phase transition (p.8301 Introduction 1st column 2nd paragraph lines 9-11 and 2nd column lines 1-4).

Cai et al. teach inside IPN hydrogels, each network may retain its own properties, whereas the proportions of the networks are varied independently. The combined properties of the IPNs can be controlled by the ratios of their component monomers (p.170, 2nd column 2nd paragraph).

Therefore, a person of ordinary skill in the art at the time the invention was made would have been motivated to combine the prior art teachings and to modify the method and the dispersion of hydrogel nanoparticles as taught by Jones et al. by adding a drug at a third temperature below a gelation temperature of the IPN nanoparticles in an aqueous mixture, according to the teachings of Kurisawa et al. with a reasonable expectation of success, because Kurisawa et al. teach IPN-structured hydrogels as a

drug microreservoir and drug release was achieved in the IPN-structured hydrogel prepared below gel transition temperature. Moreover, a person of ordinary skill in the art at the time the invention was made would have been motivated to try and to optimize the temperature in the method as taught by Jones et al. because Jones et al. teach at 70°C temperature (polymerization temperature) polymer interpenetration was low and that polymerization inside the nanoparticles can be hindered.

The selection of the ratio of the first polymer to the second polymer in the method and the dispersion of hydrogel nanoparticles as taught by Jones et al. would have been a routine matter of optimization to a person of ordinary skill in the art, said person recognizing that the phase transition properties of the IPNs can be controlled by the ratios of their component monomers. The motivation as taught by Jones would be to provide a dispersion of IPN nanoparticles with less complex phase transition behavior.

Claims 29-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cai et al. (Journal of Applied Polymer Science, 2002, Vol. 83, p.169-178) and Jones et al. (Macromolecules, 2000, Vol. 33, p.8301-8306) in view of in view of Hennink & Nostrum (Advanced Drug Delivery Reviews, 2002, Vol. 54, p.13-36).

Claims 29-47 are drawn to a method of preparing a nanocluster of cross-linked IPN nanoparticles comprising, providing a dispersion of IPN nanoparticles, adding a first cross linking agent and a second cross linking agent to the dispersion of the IPN nanoparticles, heating the IPN cross linking solution to a first temperature for a period of time, wherein the IPN nanoparticles have uniformed size and comprise a first polymer

network interpenetrating a second polymer network, mixing the nanocluster of cross-linked IPNs with a biologically active material at a second temperature, the first polymer comprises of poly(-N-isopropylacrylamide) and the second polymer comprises poly(acrylic acid), first cross-linking agent comprises EDAC and second cross linking agent comprises adipic acid dihydrazide, heating at a first temperature, about 44°C, for about 25-45 min (33-37 min), mixing cross-linked IPNs with a biologically active material at about 33°C, and hydrodynamic radius in the range from 225 nm to about 240 nm, a nanocluster of cross-linked IPN nanoparticles comprising: at least two IPN nanoparticles linked by a cross-linking group, a first polymer network interpenetrating a second polymer network, the cross linking group is adipic acid dihydrazide, wherein each IPN nanoparticles have a uniformed sized and an have an average hydrodynamic radius of nanoparticles is in the range of 155 nm to about 1000 nm.

Cai et al. teach a method of preparing a nanocluster of cross-linked nanoparticles and a nanocluster cross-linked nanoparticles (particle size 500 to 700 nm) (Abstract, and p. 172 2nd column end paragraph line 2). Cai et al. teach the microgel nanoparticles are ionic particles because of the carboxylic charge on acrylic acid (AA), in these microgel particles the AA groups tend to lie on the surface of the particles, and NIPAAm groups lie toward the inside, this prevents aggregation between microgel particles and makes the microgel particles stable in the aqueous solutions. In this conformation, the carboxyl groups of on the microgel particle surface can also be further cross-linked under suitable conditions, forming interpenetrating network structure (p.172 2nd column last paragraph and p.173 1st column). Cai et al. further teach mixing the particles with a

biologically active material (bovine serum albumin, a protein) at different temperatures (p.172, 2nd column 1st paragraph). Cai et al. teach to increase the volume and surface area of the bulk hydrogels, hydrogels can be synthesized at temperatures above the LCST of the polymer by heating the reaction near the end of the polymerization (p.169 2nd column last paragraph).

Cai et al. do not teach a dispersion of IPN nanoparticles, the first cross-linking agent comprises EDAC and second cross linking agent comprises adipic acid dihydrazide, heating at a first temperature about 44°C, for about 25-45 min (33-37 min). However, as mentioned immediately above, Jones et al. teach preparing an aqueous dispersion of IPN nanoparticles, the first polymer comprises of poly(-N-isopropylacrylamide) and the second polymer comprises poly(acrylic acid), and heating at a first temperature about 44°C, for about 25-45 min (30 minutes).

Hennink & Nostrum teach cross-liking agents EDC (or EDAC) is a highly efficient reagent to crosslink water-soluble polymers with amide bonds, and hydrogel formation by using a less toxic cross linking agent adipic acid dihydrazide in the presence of a drug, for aldehyde-mediated crosslinking (p.20 1st column 2nd paragraph) (p.19, 1st column lines 20-23).

Therefore, a person of ordinary skill in the art at the time the invention was made would have been motivated to apply the prior art teachings and to use the method of Cai et al. to cross-link the dispersion of IPN nanoparticles of Jones et al. in order to provide a method of preparing a nanocluster of cross-linked IPN nanoparticles and a nanocluster of cross-liked IPN nanoparticles with a reasonable expectation of success,

because Cai et al. teach cross-linking nanoparticles to form a larger hydrogel/nanocluster. The motivation would be to create a larger network structure.

Moreover, a person of ordinary skill in the art at the time the invention was made could have been motivated to try and use the cross-liking agents EDC and adipic acid dihydrazide as taught by Hennink & Nostrum to cross-link the dispersion of IPN nanoparticles of Jones et al. according to the teachings of Cai et al. in order to provide a method of preparing a nanocluster of cross-linked IPN nanoparticles and a nanocluster of cross-liked IPN nanoparticles, because Hennink & Nostrum teach EDC and adipic acid dihydrazide can be used to form hydrogels. The motivation as taught by Hennink & Nostrum would be to cross-link different functional groups, and low toxicity of adipic acid dihydrazide.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kade Ariani whose telephone number is (571) 272-6083. The examiner can normally be reached on 9:00 am to 5:30 pm EST Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached on (571) 272-0926. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kade Ariani
Examiner
Art Unit 1651

/Ruth A. Davis/
Primary Examiner, Art Unit 1651